



(51) International Patent Classification:

C10M 141/02 (2006.01) *C10N 10/16* (2006.01)
C10M 141/06 (2006.01) *C10N 30/06* (2006.01)
C10M 169/04 (2006.01) *C10N 30/04* (2006.01)
C10N 10/02 (2006.01) *C10N 30/10* (2006.01)
C10N 10/04 (2006.01) *C10N 30/12* (2006.01)
C10N 10/10 (2006.01) *C10N 40/25* (2006.01)
C10N 10/14 (2006.01)

(21) International Application Number:

PCT/US2015/067583

(22) International Filing Date:

28 December 2015 (28.12.2015)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/097,661 30 December 2014 (30.12.2014) US
 62/218,739 15 September 2015 (15.09.2015) US

(71) Applicant: **EXXONMOBIL RESEARCH AND ENGINEERING COMPANY** [US/US]; 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (US).

(72) Inventors: **SCHILOWITZ, Alan, M.**; 15 North 6th Avenue, Highland Park, NJ 08904 (US). **BAILLARGEON, David, J.**; 112 Morningside Drive, Cherry Hill, NJ 08003 (US). **GOODING, Beatrice, M.**; 106 Stony Brook Road, Hopewell, NJ 08525 (US). **WHITE, Michael**; 241 Adams Street, Braintree, MA 02184 (US). **MCLELLAN, Joseph**; 134 Centre Street, Quincy, MA 02169 (US). **REUST,**

Patrick; 127 Walnut Street, Apt. 3, Somerville, MA 02145 (US).

(74) Agents: **MIGLIORINI, Robert, A.** et al.; ExxonMobil Research And Engineering Company, 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: LUBRICATING OIL COMPOSITIONS WITH ENGINE WEAR PROTECTION

Fig. 1

Reference Oils	Benchmark Lubricant	HFRR Avg Film (%)	HFRR Avg Friction	HFRR Avg Wear (Microns)
Ref 1	Polyalphaolefin, 4 cS KV100 (PAO 4)	4	0.351	19.27
Ref 2	Partial formulation (absent FM, ZDDP)	3	0.168	2.81
Ref 3	Full formulation	31	0.104	1.13

(57) Abstract: A method for improving wear control, while maintaining or improving fuel efficiency, in an engine or other mechanical component lubricated with a lubricating oil by using as the lubricating oil a formulated oil. The formulated oil has a composition including a lubricating oil base stock as a major component, and a mixture of (i) at least one carboxylic acid or metal salt of a carboxylic acid (e.g., metal stearate or stearic acid), and (ii) at least one surfactant (e.g., nonionic surfactant), as a minor components. A method for improving solubility, compatibility and dispersancy of polar additives in a lubricating oil is also provided. A lubricating oil having a composition including a lubricating oil base stock as a major component, and a mixture of (i) at least one carboxylic acid or metal salt of a carboxylic acid, and (ii) at least one surfactant, as minor components. The lubricating oils are useful in internal combustion engines.

